

GEOGRAPHY AND EARTH SCIENCE (GEO/ESC)

*College of Science and Health
Department Chair: Gregory
Chu 2021 Cowley Hall,
608.785.8333 e-mail:
chu.greg@uwlax.edu*

www.uwlax.edu/geography

Professors: Ahmed, Chu, Cravins;
Associate Professor: Berlin; **Assistant
Professor:** Belby, Lin, Perroy; **Lecturer:**
Kueny

Geography Major

(All colleges, excluding Teacher Certification programs) — 39 credits – ESC 101, one course from either ESC 221 or 222, GEO 110, 201, GEO/ESC 250, 385, GEO 401; one course in cultural geography from GEO 300, 306, 307, 309; one course in techniques from GEO/ESC 345, 390, 440, 445, 455, GEO 485, 488; one course in regional geography from GEO 204, 304, 312, 318, 328, 331; one course in physical geography from GEO/ESC 422, 425, 426, 427, 460; and electives from courses listed above plus GEO 200, 202, ESC 211, GEO/ESC 270, 450, 470, 490, 495, 499.

Geography Major: Environmental Science Concentration

(All colleges, excluding Teacher Certification programs) — 52-59 credits – ESC 101, GEO 110, 200, 201, GEO/ESC 250, 385, GEO 401; three courses from ESC 211, 221, 222, GEO/ESC 422, 425, 426, 427, 460; three courses from GEO/ESC 345, 390, 440, 445, 485, GEO 488; and MTH 145; and either BIO 103 or 105, 204, 210, or CHM 103, 104, 301. Three credits of GEO/ESC 450, 490 or 499 may be applied to the major

Geography Major: Geographic Information Science Concentration

(All colleges, excluding Teacher Certification programs) — 42-43 credits – ESC 101; GEO 110, 201, GEO/ESC 250, 345, 385, 445, 455, GEO 401, 485; one course from ESC 221, 222, GEO/ESC 422, 425, 426, 427, 460; one course from GEO 300, 306, 307, 309; either one course from GEO/ESC 390, 440, GEO 488, or three credits of GEO/ESC 450, 490, 499 (450, 490 and 499 must be GIS related); and MTH 145.

Geography Major

(Teacher Certification programs) — 36 credits – ESC 101; GEO 110, 201, 204, 250, 300, 306, 309, 401, and electives in geography. GEO 200, EFN 200, and CI 381 also are required (total 5 credits). Three credits of GEO 499 may be applied to the major. Additional teacher education requirements are listed on page 111.

Geography Minor (All colleges, excluding Teacher Certification programs)

— 26 credits – ESC 101; GEO 110, 201; one course in physical geography from ESC 211, 221, 222; GEO/ESC 422, 425, 426, 427, 460; one course in cultural geography from GEO 202, 300, 306, 307, 309; one course in techniques from GEO/ ESC 250, 345, 385, 390, 440, GEO 488; one course in regional geography from GEO 204, 304, 312, 318, 328, 331; and electives in geography.

Geography Minor

(Teacher Certification programs) — 24 credits – ESC 101; GEO 110, 201, 204, 306, 309 and electives in geography. GEO 200, EFN 200 and CI 381 also are required (total five credits).

Geographic Information Science Minor

(All colleges, excluding Teacher Certification programs) — 21 credits – GEO/ESC 385, GEO 485; at least twelve credits from GEO/ ESC 250, 345, 390, 440, 445, 455, GEO 488 . Up to six credits may be from GEO/ ESC 450 and 490 and 499 may be used in this category. (450, 490 and 499 must be GIS related); one course from ESC 101, GEO 110, 200, 201, 300, 306, 307, 309. Students in this minor are required to take MTH 145. Not open to GEO/ESC majors and minors.

Geoarchaeology Minor

(All colleges, excluding Teacher Certification programs) — 23 credits – ARC 195, 404, ESC 101, 222, GEO/ESC 385, 426; and three credits of GEO/ESC 490 or 499 or ARC 409 with topic in geoarchaeology. Geography majors who select the geoarchaeology minor must take the courses listed above in addition to the 39 credits required in major. Archaeological studies majors who select the geoarchaeology minor must take courses listed above in addition to the 36 required for the major.

Earth Science Minor

(All colleges, excluding Teacher Certification programs) 24 credits – ESC 101, 221, 222; one course from GEO/ESC 422, 425, 426, 427, 460; one course from GEO/ESC 250, 345, 385, 390, 440; and electives in earth science. Geography majors who select the earth science minor must take 18 credits in courses listed above in addition to the 39 required for the major.

Earth Science Minor

(Teacher Certification programs) — 24 credits – ESC 101, 221, 222; one course from GEO/ESC 422, 425, 426, 427, 460; one course from GEO/ESC 250, 345, 385, 390, 440, and electives in earth science. GEO 200 and CI 381 also are required.

Note:

The earth science minor may be used as partial fulfillment of the requirement for a teacher certification broadfield science major. See page 111.

Broadfield Social Studies Major

(Teacher Certification program) — See description of this broadfield major on page 113.

Geography/Earth Science Department Honors Program

I. Admission

- A. Junior standing
- B. 15 completed credits in the major
- C. 3.25 grade point average in the major and a 3.00 cumulative grade point average
- D. Recommendation by two faculty members in the department

II. Program

- A. Completion of the major program in Geography and Earth Science
- B. GEO/ESC 490 — Independent Study, 2-3 credits.
- C. GEO/ESC 495 — Seminar in Geography/Earth Science (Honors Seminar), 1 credit.

III. Evaluation

- A. Cumulative 3.50 grade point average in the major and a cumulative grade point of 3.00 at graduation
- B. Distinguished performance on a paper/project in GEO/ESC 490
- C. Presentation of paper/project to the faculty and students in the department.

Geographic Information Systems Certificate

This program is a joint offering by the department of geography and earth science and the Office of Continuing Education.

Applications of Geographic Information Systems (GIS) range from business planning and public health to ecosystem management. Essentially, GIS is a tool for studying spatial problems. It links a database with map features in such a way that users can input, store, retrieve, and analyze geographic data. Students choosing this program acquire the skills and knowledge necessary to apply GIS in their chosen field of study.

The GIS Certificate is earned by taking two GIS courses and the completion of a GIS internship or undergraduate research project.

(All Colleges) 12 credits – one of the following sequences: GEO 208 and GEO 308 or GEO 385 and GEO 485; six credits from GEO 450 and/or GEO 499. (Not open to geography majors)

Note:

This certificate program currently is not available.

+ *above a course number indicates a General Education course.*

+
ESC 101 Cr. 4

Earth Environments

This course concentrates on understanding the earth's dynamic environments through the study of processes and physical and human interactions related to the lithosphere, hydrosphere and atmosphere. A scientific approach is used to examine fundamental concepts in earth and environmental science related to topics such as plate tectonics, landform development, atmospheric processes, global climate, and water resources, in order to provide an understanding of how the earth system functions and the human role in these phenomena. Lect. 3, Lab. 2. Offered Fall, Spring.

+
GEO 102 Cr. 3
Maps and Society

This course introduces all aspects of maps and how they affect the individual in society. It examines the evolution of maps, the map as an art form, the map as a communication medium for spatial knowledge, the meaning of maps and their relationship to culture and society past and present, the influence of maps on an individual through mass media and the Internet, and the way maps reflect personal and societal points of view. It focuses on privacy and civil liberty issues of the individual in the age of digital information where maps and map databases can disclose the privacy of personal space. In addition, today's GIS maps (in planning, in marketing, in hazard controls, etc.) embed substantial amounts of personal information that can affect personal security and how our lives are directly, indirectly, knowingly and unknowingly influenced. Offered Fall, Spring, Online.

+
GEO 110 Cr. 3
World Cultural Regions

This course provides an understanding of the global distribution of world cultures. The cultural, economic and natural patterns and their interrelationships are examined on a global and regional scale. The development and distribution of cultural regions within countries are included when appropriate.

+
GEO 200 Cr. 3

Conservation of Global Environments

Introduction to natural resources, resource management, environmental and land use ethics, environmental impacts of resource utilization and strategies to resolve environmental conflicts. Course examines the relationships between society and the environment from the global to the local scale.

GEO 201 Cr. 3
Geography of United States and Canada

Physical and cultural characteristics of United States and Canada. Changing patterns of land use and the accompanying economic and cultural development of the various regions.

+
GEO 202 Cr. 3

Contemporary Global Issues

This course will offer a contemporary multi-disciplinary perspective regarding the major issues and trends confronting the global society as it enters the 21st century. Emphasis will be given to a critical review and assessment of the origin and present condition of the plethora of situations and problems affecting modern global society. The student will also learn to critically evaluate current and future events. The course will incorporate the views and approaches of the following disciplines: sociology/anthropology, economics, geography, political science and history. (Cross-listed with SOC, ANT, ECO, GEO, POL, and HIS 202; may only earn credit in one department)

GEO 204 Cr. 3
Geography of Wisconsin

Geographic patterns in Wisconsin. Physiographic regions, climate, population distribution, resources and their use, agriculture, industry, transportation and urban growth. Offered occasionally.

GEO 208 Cr. 3
Applications of Geographic Information Systems I

An introduction to applied aspects of Geographic Information Systems. GIS software, with an emphasis on ArcGIS, will be used to develop working proficiency with basic GIS procedures and applications. Topics include data input and output, forming queries, data overlay processes, and creating map layouts. (Not open to geography majors).

+
ESC 211 Cr. 3
Global Warming and Climate Change

This course explores the scientific basis of global warming and climate change, and their current and likely impacts on human society and the environment, before addressing the action that could be taken by governments, by industry, and by individuals to mitigate the effect. Discussion of global warming is situated in the context of models of climate change, focusing on alternative interpretations of the effects of anthropogenic greenhouse gases on global warming. Offered Fall.

ESC 221 Cr. 4
Introduction to Climate Systems

An introduction to physical principles and the dynamic processes that govern the behavior of the atmosphere at global and regional scales. Spatial and temporal variations of energy, moisture, circulation, and weather systems; and the patterns of the world climate systems are discussed. Lect. 3, Lab. 2. Prerequisite: ESC 101. Offered Fall.

ESC 222 Cr. 4
Landforms: Processes and Regions

An introduction to the earth surface processes that are dominant in forming various types of landforms. Spatial variations in landform will be studied both at the local scale and as the outcome of large-scale global processes, including the effects of plate tectonics and global climatic change. Lect. 3, Lab. 2. Prerequisite: ESC 101. Offered occasionally.

GEO/ESC 250 Cr. 3
Fundamentals of Cartography

Methods for the collection of geographic information from various sources. Techniques of representation on maps. Emphasis on the theoretical/fundamental aspects of display of cartographic data, symbolization, map design and planning, and map evaluation through lectures and exercises. (Cross-listed with ESC, may only earn credit in GEO or ESC.) Offered Fall, Spring.

GEO/ESC 270 Cr. 1-3
Geographic Themes

Specifically selected topics or skills which may be designed for the interest of special groups will be offered with formalized instruction and methodology appropriate to geography and/or earth science. This course may be counted as an elective in the geography major or earth science minor at the discretion of the Geography/Earth Science Department. Prerequisite may be required at the discretion of the department. Repeatable for credit – maximum six. Offered occasionally.

GEO 300 Cr. 3
Population Geography

A systematic analysis of the populations of the world and the geographic factors influencing human existence. A study of the origin and distribution of populations and the cultural features with which they are associated.

GEO 304 Cr. 3
Geography of Europe

Geographic factors in the changing physical, political, cultural and economic patterns in Europe. Emphasis on northwestern, central, and southern Europe and their importance in world affairs.

GEO 306 Cr. 3
Economic Geography

This course introduces students to the global economic patterns which have shaped and conditioned the world of the 1990s, and the salient economic geography models and approaches which help to explain such patterns. Elements emphasized include the evolution of social and economic organization; the globalization of economic activity since the late 1400s; the interconnectivity of development and underdevelopment; and the relationship between development and social environmental problems. Prerequisite: GEO 110 or ECO 110 or HIS 101 or GEO/ECO/POL/ANT/SOC/HIS 202.

GEO 307 Cr. 3
Political Geography

A real differentiation and analysis of relationships between geographic factors and political entities. This includes physical environment, organization of space, cultural influences and economic capabilities.

GEO 308 Cr. 3
Applications of GIS II

Advanced exploration of geographic information systems tools and applications. GIS software, with an emphasis on ArcGIS, is used to develop advanced GIS skills. Topics include: working with coordinate systems, editing and managing relational databases, working with ArcGIS extensions, and GIS project management. Prerequisite: GEO 208. Not open to geography majors.

GEO 309 Cr. 3
Urban Geography

Geographical study of cities, their form, function, site and situation. Classification of cities, urban land use patterns and the role of the city within its region.

GEO 312 Cr. 3
Geography of Africa

Cultural, physical and economic characteristics including the bases of problems in socio-economic development are investigated from a geographic perspective. Resources, regions, and world ties are studied.

GEO 318 Cr. 3
Geography of Latin America and the Caribbean

The cultural and physical characteristics of Latin America and the Caribbean region are systematically examined and explained. This includes an examination of diverse physical and “built” environments that encompass this region, from the borderlands of northern Mexico to the Tierra Del Fuego of the south; from the lush tropical environments of the Amazon, Jamaica, and Puerto Rico, to the Altiplano and arid regions of the west; from disparate lowlands to the startling mountain zones of the Andes. Indigenous civilizations which developed out of unique arrangements with these complex environments as well as those imposed and imported since 1500 will be explored in depth. Not open for credit to students who have completed GEO 316 or 317.

GEO 328 Cr. 3

Geography of East and Southeast Asia

The geography of China, Japan, the Koreas, and Mongolia; the geography of the 10 states of Southeast Asia, including Indonesia, Thailand, Vietnam, Philippines, and Burma. Contemporary geopolitical problems and prospects; East Asia and the world; primordial and historical factors contributing to identity and conflict. The course emphasizes human-cultural patterns, salient physical characteristics, and the relationship between these.

GEO 331 Cr. 3

Geography of the Middle East, Central and South Asia

Cultural, physical and economic elements of this predominantly Islamic domain are examined from a geographic perspective for a better understanding of this region of the world. Cultural and socio-economic impact of these regions on other regions and cultures of the world, including their resources, are investigated.

GEO/ESC 345 Cr. 3

Remote Sensing of the Environment

Introduction to remote sensing, emphasizing satellite multispectral observations of the earth applied to such fields as agriculture, forestry, water resources, urban and regional planning, and environmental assessment. Upper Midwest and selected areas worldwide are explored with visual and digital image processing techniques. (Cross-listed with ESC, may only earn credit in GEO or ESC.) Offered Fall.

GEO/ESC 385 Cr. 3

Introduction to Geographic Information Systems

An introduction to both theoretical and applied aspects of Geographic Information Systems (GIS). GIS software, with an emphasis on ArcGIS, will be used to explore geographic questions. Hands-on exercises pertaining to environmental science, natural resource management, business, and urban planning will be used to complement lecture material. Topics will include data organization, database structure, input and output, data quality, and geographic analysis of spatial and attribute data. (Cross-listed with ESC, may only earn credit in GEO or ESC.) Offered Fall, Spring.

GEO/ESC 390 Cr. 3

Geographic Field Methods

Covers fundamental concepts of field methods as applied to physical, cultural, urban and environmental geography. Students will gain experience in sampling, field surveying, GPS mapping, and observational data collection techniques. Includes reconnaissance and detailed surveys using current methods, GPS and field equipment; and practical integration of field data into a geographic information system. Prerequisite: GEO/ESC 385 or concurrent enrollment. (cross-listed with ESC, may only earn credit in GEO or ESC). Offered Fall.

GEO/ESC 401 Cr. 1

Focus on Geography: A Capstone Course

A seminar-style course designed to prepare students for graduate school and/or a career in geography/earth science. This course will cover the basic concepts of interviewing, graduate school application, oral presentation of a topic, and the writing of professional abstracts. The development of the field will be studied by the reading and discussion of landmark articles in geography and earth science. Students are expected to actively participate in the assessment of their major. Prerequisite: senior standing. (Cross-listed with ESC, may only earn credit in GEO or ESC.) Pass/Fail grading. Offered Fall.

GEO/ESC 422/522 Cr. 3

Meteorology and Weather Forecasting

Various principles and laws which govern the behavior of the atmosphere are investigated. Laws of gases and radiation, energy exchange between the earth and the atmosphere, laws of motion, various forces governing atmospheric motion, atmospheric moisture and psychrometry, condensation, precipitable water and precipitation, atmospheric stability/instability, thermodynamic characteristics of the atmosphere, vorticity, and synoptic meteorology are discussed. Surface and upper-air charts, synoptic patterns, thermodynamic charts, radar and satellite images, and weather patterns are analyzed for weather forecasting. Prerequisite: ESC 101 or equivalent. (Cross-listed with ESC, may only earn credit in GEO or ESC.) Offered Spring.

GEO/ESC 425/525 Cr. 3

Biogeography

A systematic analysis of the geographic distribution of organisms from historical, ecological and regional perspectives. Emphasis is placed on the principles and the methods of biogeography. Special reference is made to bio-geographic regions, the distribution of organisms in space and time, and ecological biogeography. Prerequisite: ESC 221 and junior standing. (Cross-listed with ESC, may only earn credit in GEO or ESC.) Offered alternate years.

GEO/ESC 426/526 Cr. 3

Soil Morphology and Genesis

A systematic analysis of soil morphology, weathering, factors of soil formation and soil-forming processes. Emphasis is placed on soil landscapes and the field study of soils. Special reference is made to current systems of soil classification. Prerequisite: ESC 221 or 222 and junior standing. (Cross-listed with ESC, may only earn credit in GEO or ESC.) Offered occasionally.

GEO/ESC 427 Cr. 3

Water Resources

A study of physical water resources systems and management and utilization of water as a resource. Class activities will include seminars on critical water resource management issues and hands-on analysis of pertinent data, including exercises in Geographic Information Systems. Prerequisite: ESC 221 or 222. (Cross-listed with ESC, may only earn credit in GEO or ESC.) Offered occasionally.

GEO/ESC 440/540 Cr. 3

Geographic Interpretation of Aerial Photographs

Systematic applications of aerial photographs in the interpretation and analysis of geographic problems. Emphasis is placed on digital photograph interpretation within a geographic information system. Topics include urban and rural land use, natural resource and environmental assessment. (Cross-listed with ESC, may only earn credit in GEO or ESC.) Lect.2, Lab 2. Prerequisite: GEO/ESC 385 and junior standing. Offered occasionally.

GEO/ESC 445/545**Cr. 3****Advanced Remote Sensing**

Advanced techniques of digital satellite and airborne image analysis and processing, emphasizing theory and applications in natural resource, land use and environmental assessment. Includes practical approaches to integrating imagery with geographic information systems for spatial analyses and decision making. Data acquisition, integrity, manipulation, formatting, storage and retrieval are also examined. Prerequisite: GEO/ESC 345. (Cross-listed in ESC, may only earn credit in GEO or ESC.) Offered Spring.

GEO/ESC 450**Cr. 3-12****Geography Internship**

Practical experience with a variety of organizations where the student's geographic background and training can be utilized to advantage. Students are placed in carefully selected positions screened by the department. Actual work supervision is accomplished by personnel of the selected agency and the department staff coordinator. A maximum of five credits may be counted toward the non-education major. Prerequisite: geography major, junior standing, overall grade point of 2.25 with a minimum of 2.75 in geography. (Cross-listed with ESC, may only earn credit in GEO or ESC.) Pass/Fail grading. Offered Fall, Spring, Summer.

GEO/ESC 455/555**Cr. 3****Applied Map Design and Production in Cartography and GIS**

This course explores both manual and digital methods in cartographic design and production, map design theory, perceptual aspects of map symbols, methods of production for small format and large format maps, cost efficiency factors, design environments in GIS packages, production of both monochromatic and color maps, map publishing. Prerequisite: GEO 250. (Cross-listed in ESC, may only earn credit in GEO or ESC.) Offered Spring.

GEO/ESC 460/560**Cr. 3****Environmental Hazards and Land Use Planning**

Environmental processes are investigated in light of the hazards they might pose for development and how they may be avoided or mitigated by proper land use planning. Prerequisite: ESC 221 or 222. (Cross-listed in ESC, may only earn credit in GEO or ESC.) Offered occasionally.

GEO/ESC 470/570**Cr. 1-3****Special Topics in Geography/Earth Science**

Specifically selected topics or skills which may be designed for the interest of special groups will be offered with formalized instruction and methodology appropriate to geography and/or earth science. May be counted as an elective in the geography major or earth science minor at the discretion of the Geography/Earth Science Department. Prerequisite may be required at the discretion of the department. (Cross-listed in ESC, may only earn credit in GEO or ESC.) Repeatable for credit – maximum six. Offered occasionally.

GEO/ESC 476/576**Cr. 1-3****Geography/Earth Science Topics for Teachers**

Selected topics in geography and/or earth science pertinent to applications in the teachers' classrooms. Courses are designed to meet the needs of teachers so that they may implement the course material into their classroom teaching. (Cross-listed in ESC, may only earn credit in GEO or ESC.) Offered occasionally.

GEO 485/585**Cr. 3****Advanced Geographic Information Systems**

Advanced theories in geographic information systems database structures, advanced applications, database transfers, database management, use of census data, spatial analysis, and decision-making. Emphasis on ARCGIS and its applications. Integration of GIS with remote sensing and GPS. Prerequisite: MTH 145 and GEO/ESC 385.

GEO 488**Cr. 3****Spatial Data Analysis**

Theory, methods, and techniques for quantitative analysis of spatial data. Students will learn and employ basic quantitative techniques for describing, modeling, and analyzing spatial data. This course explores point pattern analysis, methods for continuous data, and spatial regression. Focus will be on the interpretation and the application of spatial data analysis techniques to address geographic problems. Prerequisite: MTH 145. Offered Fall.

GEO/ESC 490/590**Cr. 2-3****Independent Study**

Individual readings and investigation of selected problems in geography. Open to senior majors and minors with a "B" (3.00) average in geography. Registration with consent of regular adviser, instructor, department chairperson, and the dean of the college in which the student is enrolled. (Cross-listed in ESC, may only earn credit in GEO or ESC.) Maximum credit applicable to major - three; maximum credit from any instructor - three. Repeatable for credit – maximum six. Offered Fall, Winter, Spring, Summer.

GEO/ESC 495/595**Cr. 1-3****Seminar in Geography/ Earth Science**

Investigation into various topics in geography or the earth sciences. Varying topics will be offered at intervals with a specific title assigned to each. Prerequisite: two semesters of geography and/or earth science. Additional prerequisite may be required by the instructor. (Cross-listed in ESC, may only earn credit in GEO or ESC.) Repeatable for credit – maximum six. Variable topics; check semester timetables. Offered occasionally.

GEO/ESC 499**Cr. 1-3****Undergraduate Research**

Individual research by an advanced student under the supervision of a faculty member in the geography/earth science department. The student must present a written report and either have their work published in an appropriate journal or presented either orally or by poster at a conference acceptable to the department chair and adviser. A contract must be signed by the student, the project adviser, the student's adviser and the geography/earth science department chair. Repeatable for credit – maximum six. Three credits may be applied to a major or minor in geography and earth science. Prerequisite: 12 credits of geography and/or earth science with six of the credits numbered 300 or above, or consent of the instructor and department chair. (Cross-listed in ESC, may only earn credit in GEO or ESC.) Offered Fall, Winter, Spring, Summer.

**German Studies
See Modern Languages
page 209.**